

Patent Application
Docket Number: EMC-03-100
Applicant: Haase et al.
EMC CONFIDENTIAL
Express Mailing Label No. EK900600582US

What is claimed is:

1. In a data storage environment having a first volume of data denominated as the source being stored on a data storage system, and a second volume of data denominated as the clone and which has data content that is a copy of the data content of the source being stored on the data storage system or on another data storage system, a method of protecting the clone's data content during a restoration of the source, the method comprising the steps of:
restoring the source by copying data content from the clone to overwrite the data content of the source; and allowing host reads and writes to the Source during the restore; and
preserving the data content of the clone by not allowing it to be overwritten by host writes during the restoring step.
2. The method of claim 1, wherein the source and the clone are each represented by respective first and second logical units.
3. The method of claim 1, wherein a map denominated as a protected restore map is used to track extents of the source that are modified during the restoring and preserving steps.
4. The method of claim 1, wherein a map denominated as a clone delta map is used to track extents of the clone that may be different from the clone and the source.

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5. The method of claim 2, wherein a map denominated as a protected restore map is used to track extents of the source that are modified during the restoring and preserving step.

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6. The method of claim 5, wherein the clone delta map is used to copy only extents that are different between the clone and its source during the restoring step.

7. The method of claim 6, wherein the protected restore map is coordinated with the

10 clone delta map for efficient processing of requests to write data to the source.

8. A system for protecting data content during restoration of data from a second volume of data to a first volume of data, the system comprising:

a data storage system having a first volume of data denominated as the source being stored on a data storage system, and a second volume of data denominated as the clone and which has data content that is a copy of the data content of the source being stored on the data storage system or on another data storage system;

computer-executable program logic configured for causing the following computer-executed steps to occur:

20 restoring the source by copying data content from the clone to overwrite the data content of the source; and allowing host reads and writes to the Source during the restore; and

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preserving the data content of the clone by not allowing it to be overwritten by host writes during the restoring step.

9. The system of claim 8, wherein the source and the clone are each represented by
5 respective first and second logical units.

10. The system of claim 8, wherein a map denominated as a protected restore map is used to track extents of the source that are modified during the restoring and preserving steps.

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11. The system of claim 8, wherein a map denominated as a clone delta map is used to track extents of the clone that may be different from the clone and the source.

12. The system of claim 9, wherein a map denominated as a protected restore map is
15 used to track extents of the source that are modified during the restoring and preserving step.

13. The system of claim 12, wherein the clone delta map is used to copy only extents that are different between the clone and its source during the restoring step.

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14. The system of claim 13, wherein the protected restore map is coordinated with the clone delta map for efficient processing of requests to write data to the source.

15. A program product for use in a data storage environment and being for protecting data content during restoration of data from a second volume of data to a first volume of data, wherein the data storage environment includes:

a data storage system having a first volume of data denominated as the source
5 being stored on a data storage system, and a second volume of data denominated as the clone and which has data content that is a copy of the data content of the source being stored on the data storage system or on another data storage system; and-

the program product includes computer-executable logic contained on a computer-readable medium and which is configured for causing the following computer-
10 executed step to occur:

restoring the source by copying data content from the clone to overwrite the data content of the source; and allowing host reads and writes to the Source during the restore; and

preserving the data content of the clone by not allowing it to be overwritten by host writes during the restoring step.

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16. The program product of claim 15, wherein the source and the clone are each represented by respective first and second logical units.

17. The program product of claim 15, wherein a map denominated as a protected
20 restore map is used to track extents of the source that are modified during the restoring and preserving steps.

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18. The program product of claim 15, wherein a map denominated as a clone delta map is used to track extents of the clone that may be different from the clone and the source.

5 19. The program product of claim 16, wherein a map denominated as a protected restore map is used to track extents of the source that are modified during the restoring and preserving step.

10 20. The program product of claim 19, wherein the clone delta map is used to copy only extents that are different between the clone and its source during the restoring step.

21. The program product of claim 20, wherein the protected restore map is coordinated with the clone delta map for efficient processing of requests to write data to the source.